

# NOT FOR PUBLICATION

## ONLINE APPENDIX 1 - PROOFS

**Proof of Proposition 2.** As in Proposition 1, we obtain the optimal labor supply of altruistic individuals by differentiating with respect to  $x$ :

$$\begin{aligned}\frac{dU_i^A(w, x, t)}{dx_i} &= (1 - t + \frac{t}{n})w_i - x_i + \frac{A}{n-1} \cdot (n-1)\frac{t}{n}w_i \leq 0 \\ x_i^{\text{altruism}}(w_i, t) &= \left(1 - t + \frac{(1+A)t}{n}\right)w_i > \left(1 - t + \frac{t}{n}\right)w_i = x_i^*(w_i, t) \\ \frac{dx_i^{\text{altruism}}(w_i, t)}{dA} &= \frac{t}{n}w_i > 0\end{aligned}$$

To obtain the labor supply function of an inequality averse individual, we re-write the Fehr-Schmidt utility functions based on the productivity rank of the individual:

$$U_i^{FS}(w, x, t) = \mu_i \cdot U_i(w_i, x_i, t) - \frac{\alpha}{n-1} \cdot \sum_{j=i+1}^n U_j(w_j, x_j, t) + \frac{\beta}{n-1} \cdot \sum_{j=1}^{i-1} U_j(w_j, x_j, t)$$

where

$$\mu_i = \frac{n-1 + \alpha(n-i) - \beta(i-1)}{n-1}$$

We can further simplify  $U_i^{FS}(w, x, t)$  as follows:

$$\begin{aligned}U_i^{FS}(w, x, t) &= \mu_i \cdot \left[(1-t)w_i x_i - \frac{1}{2}x_i^2\right] - \frac{\alpha}{n-1} \cdot \sum_{j=i+1}^n \left[(1-t)w_j x_j - \frac{1}{2}x_j^2\right] + \\ &+ \frac{\beta}{n-1} \cdot \sum_{j=1}^{i-1} \left[(1-t)w_j x_j - \frac{1}{2}x_j^2\right] + \frac{t}{n} \cdot \sum_{j=1}^n w_j x_j\end{aligned}$$

$$\frac{dU_i^{FS}(w, x, t)}{dx_i} = \mu_i \cdot [(1-t)w_i - x_i] + \frac{t}{n}w_i = 0 \Rightarrow x_i^{FS} = w_i \cdot \left[1 - t + \frac{1}{\mu_i} \cdot \frac{t}{n}\right]$$

$$\text{where } \mu_i = 1 + \frac{\alpha(n-i) - \beta(i-1)}{n-1} > 0 \text{ for all } i \in \{1, 2, \dots, n\}$$

Therefore, the value of  $\mu_i$  determines the relation between  $x_i^*(w_i, t)$  and  $x_i^{FS}(w_i, t)$  as specified in the second part of the proposition. **Q.E.D.**

**Proof of Proposition 3.** Consider first case of altruistic preferences,  $A \geq 0$ . To establish the equilibrium tax rate in this society we first re-write the utility of individual  $i$ , adjusting for the labor supply effects of  $A$ :

$$\begin{aligned}
U_i^A(w, x, t)^* &= \frac{1}{2}w_i^2 \left[ (1-t)^2 - \frac{(A+1)^2}{n^2}t^2 \right] + \frac{t}{n} \left( 1-t + \frac{A+1}{n}t \right) \sum_j w_j^2 + \\
&+ \frac{A}{2(n-1)} \left[ (1-t)^2 - \frac{(A+1)^2}{n^2}t^2 \right] \sum_{j \neq i} w_j^2 + A \frac{t}{n} \left( 1-t + \frac{A+1}{n}t \right) \sum_j w_j^2 = \\
&= \frac{1}{2}w_i^2 \left[ (1-t)^2 - \frac{(A+1)^2}{n^2}t^2 \right] \left( 1 - \frac{A}{n-1} \right) + \\
&+ Z \cdot \left( 1-t + \frac{A+1}{n}t \right) \left( \frac{t}{n} + \frac{A}{2(n-1)} \left( 1-t - \frac{A+1}{n}t \right) + A \frac{t}{n} \right) \\
\Rightarrow \frac{dU_i^A(w, x, t)^*}{dt} &= \frac{n-1-A}{n^2(n-1)} \cdot \left[ Z \cdot (n-(2+A)(n-1-A)t) - w_i^2 \cdot (n^2(1-t) + (1+A)^2t) \right] \\
\frac{d^2U_i^A(w, x, t)^*}{dt^2} &= -\frac{(n-1-A)^2}{n^2(n-1)} \cdot \left[ (2+A)Z - (n+1+A)w_i^2 \right]
\end{aligned}$$

Single peakedness is easily verified, and we obtain the optimal tax for each level of productivity:

$$t^A(w_i) = \begin{cases} \frac{n^2}{n^2-(1+A)^2} \cdot \frac{\frac{1}{n}Z - w_i^2}{\frac{2+A}{n+1+A}Z - w_i^2} & \text{if } w_i^2 < \frac{1}{n}Z \\ 0 & \text{if } w_i^2 > \frac{1}{n}Z \end{cases}$$

We now compare this with the ideal tax rate of the median productivity individual if  $A = 0$ . The equilibrium tax is positive,  $t_m^* > 0$ , because  $w_m^2 < \frac{1}{n}Z$ :

$$\frac{n^2}{n^2-(1+A)^2} \cdot \frac{\frac{1}{n}Z - w_m^2}{\frac{2+A}{n+1+A}Z - w_m^2} < \frac{n^2}{n^2-1} \cdot \frac{\frac{1}{n}Z - w_m^2}{\frac{2}{n+1}Z - w_m^2} \Leftrightarrow \frac{n^2-1}{n^2-(1+A)^2} < \frac{\frac{2+A}{n+1+A}Z - w_m^2}{\frac{2}{n+1}Z - w_m^2}$$

The last inequality is satisfied for all  $A \in [0, 1)$  as long as  $n > 3$  and  $w_m^2 < \frac{1}{n}Z$ , which completes the proof of the first half of the proposition.

Consider next the case of inequality averse preferences, with Fehr-Schmidt parameters satisfying  $0 < \beta \leq \alpha \leq \bar{\alpha}(\beta, n)$ . Given the labor supply functions derived in Proposition 2, we can rewrite the utility of the median individual  $m$  as:

$$\begin{aligned}
U_m^{FS}(w, x, t) &= \frac{1}{2}w_m^2 \left( (1-t)^2 - \frac{t^2}{\mu_m^2 n^2} \right) + \frac{t}{n} \cdot \sum_{j=1}^n w_j^2 \left( 1-t + \frac{t}{\mu_j n} \right) - \\
&- \frac{\alpha}{2(n-1)} \cdot \sum_{j>m} \left[ w_j^2 \left( (1-t)^2 - \frac{t^2}{\mu_j^2 n^2} \right) - w_m^2 \left( (1-t)^2 - \frac{t^2}{\mu_m^2 n^2} \right) \right] - \\
&- \frac{\beta}{2(n-1)} \cdot \sum_{j<m} \left[ w_m^2 \left( (1-t)^2 - \frac{t^2}{\mu_m^2 n^2} \right) - w_j^2 \left( (1-t)^2 - \frac{t^2}{\mu_j^2 n^2} \right) \right]
\end{aligned}$$

The first-order condition becomes:

$$\begin{aligned}
\frac{dU_m^{FS}(w, x, t)}{dt} &= -(1-t)w_m^2 - \frac{t}{n^2} \cdot \frac{w_m^2}{\mu_m^2} + \frac{1}{n} \cdot \sum_{j=1}^n w_j^2 - \frac{2t}{n} \cdot \sum_{j=1}^n w_j^2 + \frac{2t}{n^2} \cdot \sum_{j=1}^n \frac{w_j^2}{\mu_j} \\
&\quad + \frac{\alpha(1-t)}{n-1} \cdot \sum_{j>m} w_j^2 + \frac{\alpha t}{n^2(n-1)} \cdot \sum_{j>m} \frac{w_j^2}{\mu_j^2} - \frac{\alpha(1-t)}{2} w_m^2 - \frac{\alpha t}{2n^2} \cdot \frac{w_m^2}{\mu_m^2} + \\
&\quad + \frac{\beta(1-t)}{2} w_m^2 + \frac{\beta t}{2n^2} \cdot \frac{w_m^2}{\mu_m^2} - \frac{\beta(1-t)}{n-1} \cdot \sum_{j<m} w_j^2 - \frac{\beta t}{n^2(n-1)} \cdot \sum_{j<m} \frac{w_j^2}{\mu_j^2} = \\
&= \left( \frac{1}{n} Z - \mu_m w_m^2 \right) + \left( \frac{\alpha}{n-1} \sum_{j>m} w_j^2 - \frac{\beta}{n-1} \sum_{j<m} w_j^2 \right) - t \cdot \left[ \frac{2}{n} Z - \mu_m w_m^2 + \frac{w_m^2}{n^2 \mu_m} - \frac{2}{n^2} \sum_{j=1}^n \frac{w_j^2}{\mu_j} \right] \\
&\quad - t \cdot \left[ \left( \frac{\alpha}{n-1} \sum_{j>m} w_j^2 - \frac{\beta}{n-1} \sum_{j<m} w_j^2 \right) - \left( \frac{\alpha}{n^2(n-1)} \sum_{j>m} \frac{w_j^2}{\mu_j^2} - \frac{\beta}{n^2(n-1)} \sum_{j<m} \frac{w_j^2}{\mu_j^2} \right) \right] \leq 0
\end{aligned}$$

where  $\mu_m = \frac{2+\alpha-\beta}{2}$  and  $Z = \sum_{j=1}^n w_j^2$ . Thus, the ideal tax rate of the median individual can be written as

$$t_m^{FS} = \begin{cases} \frac{\frac{1}{n}Z - w_m^2 + C}{\frac{2}{n}Z - w_m^2 - \frac{2}{n^2} \sum_{j=1}^n \frac{w_j^2}{\mu_j} + D} & \text{if } w_m^2 \leq \frac{1}{n}Z + C \\ 0 & \text{if otherwise} \end{cases}$$

where

$$C = \left( \frac{\alpha}{n-1} \sum_{j>m} w_j^2 - \frac{\beta}{n-1} \sum_{j<m} w_j^2 \right) - \frac{\alpha-\beta}{2} w_m^2 > 0$$

$$D = \left( \frac{\alpha}{n-1} \sum_{j>m} w_j^2 - \frac{\beta}{n-1} \sum_{j<m} w_j^2 \right) - \left( \frac{\alpha}{n^2(n-1)} \sum_{j>m} \frac{w_j^2}{\mu_j^2} - \frac{\beta}{n^2(n-1)} \sum_{j<m} \frac{w_j^2}{\mu_j^2} \right) + w_m^2 \cdot \left[ \frac{1}{n^2 \mu_m} - \frac{\alpha-\beta}{2} \right]$$

We next show that the median ideal tax rate is higher than the baseline model with standard preferences, the latter given by:

$$t_m^* = \begin{cases} \frac{\frac{1}{n}Z - w_m^2}{\frac{2}{n}Z - w_m^2 + \frac{1}{n^2} w_m^2 - \frac{2}{n^2} Z} & \text{if } w_m^2 \leq \frac{1}{n}Z \\ 0 & \text{if otherwise} \end{cases}$$

Since  $C > 0$  for  $n \geq 3$ , we will focus on interior  $(t_m^{FS}, t_m^*)$  and show that  $t_m^{FS} > t_m^*$ . First, note that the terms in D that have  $n^2$  in the denominator vanish for large  $n$ , so  $\lim_{n \rightarrow \infty} D = C$ , so for large  $n$  the result is proved without requiring the condition,  $\alpha \leq \bar{\alpha}(\beta, n)$ . For small  $n$  (as in the experiment), we need to consider the second order terms in  $D$ , in the following analysis:

$$\frac{\frac{1}{n}Z - w_m^2 + C}{\frac{2}{n}Z - w_m^2 - \frac{2}{n^2} \sum_{j=1}^n \frac{w_j^2}{\mu_j} + D} > \frac{\frac{1}{n}Z - w_m^2}{\frac{2}{n}Z - w_m^2 + \frac{1}{n^2} w_m^2 - \frac{2}{n^2} Z} \Leftrightarrow$$

$$\begin{aligned}
& \left( \frac{1}{n}Z - w_m^2 \right) \left( \frac{2}{n}Z - w_m^2 \right) + \left( \frac{1}{n}Z - w_m^2 \right) \frac{w_m^2}{n^2} - \left( \frac{1}{n}Z - w_m^2 \right) \frac{2}{n^2}Z + C \left( \frac{2}{n}Z - w_m^2 + \frac{w_m^2}{n^2} - \frac{2}{n^2}Z \right) > \\
& > \left( \frac{1}{n}Z - w_m^2 \right) \left( \frac{2}{n}Z - w_m^2 \right) - \left( \frac{1}{n}Z - w_m^2 \right) \frac{2}{n^2} \sum_{j=1}^n \frac{w_j^2}{\mu_j} + D \left( \frac{1}{n}Z - w_m^2 \right) \Leftrightarrow \\
& C \left( \frac{2}{n}Z - w_m^2 + \frac{w_m^2}{n^2} - \frac{2}{n^2}Z \right) + \left( \frac{1}{n}Z - w_m^2 \right) \frac{w_m^2}{n^2} + \frac{2}{n^2} \left( \frac{1}{n}Z - w_m^2 \right) \sum_{j=1}^n w_j^2 \left( \frac{1}{\mu_j} - 1 \right) > D \left( \frac{1}{n}Z - w_m^2 \right)
\end{aligned}$$

Notice that  $C > 0$  and  $\frac{2}{n}Z - w_m^2 + \frac{w_m^2}{n^2} - \frac{2}{n^2}Z > \frac{1}{n}Z - w_m^2$  for  $n \geq 3$ . Therefore, it is enough to show that

$$\begin{aligned}
& C + \frac{w_m^2}{n^2} + \frac{2}{n^2} \sum_{j=1}^n w_j^2 \left( \frac{1}{\mu_j} - 1 \right) > D \Leftrightarrow \\
& \left( \frac{\alpha}{n-1} \sum_{j>m} w_j^2 - \frac{\beta}{n-1} \sum_{j<m} w_j^2 \right) - \frac{\alpha-\beta}{2} w_m^2 + \frac{w_m^2}{n^2} + \frac{2}{n^2} \sum_{j=1}^n w_j^2 \left( \frac{1}{\mu_j} - 1 \right) > \\
& > \left( \frac{\alpha}{n-1} \sum_{j>m} w_j^2 - \frac{\beta}{n-1} \sum_{j<m} w_j^2 \right) - \left( \frac{\alpha}{n^2(n-1)} \sum_{j>m} \frac{w_j^2}{\mu_j^2} - \frac{\beta}{n^2(n-1)} \sum_{j<m} \frac{w_j^2}{\mu_j^2} \right) + w_m^2 \cdot \left[ \frac{1}{n^2 \mu_m} - \frac{\alpha-\beta}{2} \right] \\
& \left( \frac{\alpha}{n^2(n-1)} \sum_{j>m} \frac{w_j^2}{\mu_j^2} - \frac{\beta}{n^2(n-1)} \sum_{j<m} \frac{w_j^2}{\mu_j^2} \right) + \frac{2}{n^2} \sum_{j=1}^n w_j^2 \left( \frac{1}{\mu_j} - 1 \right) > w_m^2 \cdot \left[ \frac{1}{n^2 \mu_m} - \frac{1}{n^2} \right]
\end{aligned}$$

We establish the last inequality in two steps.

Step 1:

$$\frac{\alpha}{n^2(n-1)} \sum_{j>m} \frac{w_j^2}{\mu_j^2} \geq \frac{\beta}{n^2(n-1)} \sum_{j<m} \frac{w_j^2}{\mu_j^2}$$

If  $\frac{\alpha}{\beta} < \frac{n+1}{n-3}$ , and all individuals above the median have  $\mu_j < 1$ , while all individuals below or equal to the median have  $\mu_j \geq 1$ , where  $\mu_j = 1 + \frac{\alpha(n-j)-\beta(j-1)}{n-1}$ . Therefore, cutoff value  $\bar{\alpha}(\beta, n)$  will satisfy  $\bar{\alpha}(\beta, n) < \beta \cdot \frac{n+1}{n-3}$ . In this case there are the same number of individuals with productivity above and below the median, and we get

$$\frac{\alpha}{n-1} \sum_{j>m} \frac{w_j^2}{\mu_j^2} \geq \frac{\alpha}{n-1} \sum_{j>m} \frac{w_m^2}{\mu_m} = \frac{\alpha}{2} \cdot \frac{w_m^2}{\mu_m} \geq \frac{\beta}{2} \cdot \frac{w_m^2}{\mu_m} \geq \frac{\beta}{n-1} \sum_{j<m} \frac{w_j^2}{\mu_j^2}$$

Step 2:

$$\begin{aligned}
& \sum_{j=1}^n w_j^2 \left( \frac{1}{\mu_j} - 1 \right) > \frac{1}{2} w_m^2 \cdot \left[ \frac{1}{\mu_m} - 1 \right] \Leftrightarrow \\
& \sum_{j>m} w_j^2 \left( \frac{1}{\mu_j} - 1 \right) - \sum_{j<m} w_j^2 \left( 1 - \frac{1}{\mu_j} \right) > \frac{w_m^2}{2} \cdot \left[ 1 - \frac{1}{\mu_m} \right] = w_m^2 \cdot \frac{\alpha-\beta}{2(2+\alpha-\beta)} \Leftrightarrow
\end{aligned}$$

$$\sum_{j>m} w_j^2 \left( \frac{1}{\mu_j} - 1 \right) - \sum_{j<m} w_j^2 \left( 1 - \frac{1}{\mu_j} \right) > w_m^2 \cdot \left[ \sum_{j>m} \left( \frac{1}{\mu_j} - 1 \right) - \sum_{j<m} \left( 1 - \frac{1}{\mu_j} \right) \right] \Leftrightarrow$$

Thus, it is enough to show that

$$\sum_{j>m} \left( \frac{1}{\mu_j} - 1 \right) - \sum_{j<m} \left( 1 - \frac{1}{\mu_j} \right) > \frac{\alpha - \beta}{2(2 + \alpha - \beta)}$$

Since there are an equal number of individuals with productivity above and below the median, one can pair them in the following way:  $\left( \frac{n+3+2k}{2}, \frac{n-1-2k}{2} \right)$  for  $k = 0, \dots, \frac{n-3}{2}$ . So there are  $\frac{n-1}{2}$  pairs. We rewrite the inequality above as follows:

$$\sum_{k=0}^{\frac{n-3}{2}} \left( \frac{n-1}{n-1+\alpha n+\beta-\frac{n+3+2k}{2}(\alpha+\beta)} + \frac{n-1}{n-1+\alpha n+\beta-\frac{n-1-2k}{2}(\alpha+\beta)} - 2 \right) > \frac{\alpha - \beta}{2(2 + \alpha - \beta)}$$

The left-hand side of the inequality is increasing in  $k$ , therefore, the smallest difference for all the  $k$ -pairs is the one when  $k = 0$ , that is, it is enough to show that

$$\frac{n-1}{2} \cdot \left[ \frac{n-1}{n-1+\alpha n+\beta-\frac{n+3}{2}(\alpha+\beta)} + \frac{n-1}{n-1+\alpha n+\beta-\frac{n-1}{2}(\alpha+\beta)} - 2 \right] > \frac{\alpha - \beta}{2(2 + \alpha - \beta)}$$

The last inequality is satisfied for  $\alpha = \beta \in (0, 1)$ . It is straightforward to show that for any parameter  $\beta \in (0, 1)$  and any  $n \geq 3$ , there exists  $\beta < \bar{\alpha}(\beta, n) < \beta \frac{n+1}{n-3}$  such that inequality above is satisfied for all  $\alpha \in [\beta, \bar{\alpha}(\beta, n)]$ , which completes the proof. **QED**

## ONLINE APPENDIX 2 - SAMPLE INSTRUCTIONS

### Instructions for DD-High treatment

You are about to participate in an experiment on decision-making and you will be paid for your participation in cash privately at the end of the session.

The currency in this experiment is called tokens. All payoffs are denominated in this currency. Tokens that you earn during the experiment will be converted into US dollars using the rate 200 Tokens = \$1. In addition, you will be paid a \$10 participation fee if you complete the experiment. The money you earn will depend on your decisions and the decisions of others.

Do not talk to or attempt to communicate with other participants during the session. Please take a minute and turn off all electronic devices, especially phones. During the experiment you are not allowed to open or use any other applications on these laboratory computers, except for the interface of the experiment.

The experiment consists of two parts. Each part is self-contained and consists of 10 rounds. Before the beginning of each part, we will read out loud detailed instructions about that part and the computer interface will be explained.

**Part I:** There will be 10 rounds in Part 1. Before the first round begins, all participants will be randomly divided into groups of 5 participants each. In addition, each participant will be assigned a value  $V$ . Your group assignment and your assigned value will stay the same  $V$  for all 10 rounds of Part I.

There are 5 possible values of  $V$ :  $V = 2$ ,  $V=6$ ,  $V=10$ ,  $V=14$  and  $V=35$ . One member in each group will be assigned  $V = 2$ , one member  $V=6$ , one member  $V=10$ , one member  $V=14$  and one member  $V=35$ . The computer will do the assignments randomly. Your assigned value will be displayed on your computer screen.

Your task in each round is to choose an investment level. Your investment can be any number between 0 and 25 (up to two decimal places). If you choose investment  $X$  and your value is  $V$ , this will generate your total investment earnings equal to  $V \cdot X$ . For example, if  $V = 10$  and  $X=4$ , then your total investment earnings in that round are computed by  $10 \cdot 4 = 40$  tokens.

However, investment is not free. The cost to you of investing  $X$  is equal to  $0.5 \cdot X^2$ . In the example just given, the investment of  $X=4$  costs you 8 tokens. These costs are subtracted from your earnings at the end of the round.

A portion of your investment earnings for the round will be taxed. If the tax rate is  $T\%$ , then your taxes will equal  $T\%$  of your investment earnings, and you will keep the remaining  $(100-T)\%$  of your investment earnings. The amount you keep after taxes is called your after tax investment earnings. Recall the example just given, where  $V = 10$  and  $X=4$ , and your total investment earnings is 40 tokens. If the tax rate is 50% then your taxes equal 20 tokens and your after tax investment earnings, which are yours to keep, equal 20 tokens.

The taxes everyone in your group pays are not thrown away. Rather, the total taxes collected from all members of your group are rebated to the group members in equal shares at the end of each round. For example, if the total amount collected as taxes from all members of the group equals 200 tokens, then each member will receive back one fifth of this amount,

or 40 tokens. Note that all members of the group are taxed at the same tax rate in a round, and all group members share equally the total taxes collected in the group.

To summarize up, your payoff in a round depend on the value  $V$  assigned to you at the beginning of round 1, your investment  $X$ , tax rate  $T$  and the tax rebate, which is determined by the total taxes collected from all members in your group. Your total earnings in a round consist of three parts

$$\text{Total Earnings} = \text{Your After Tax Investment Earnings} - \text{Your Cost of Investment} + \text{Tax Rebate}$$

Thus, your total earnings for the round in this example would be equal to  $20 - 8 + 40 = 52$  tokens.

At the beginning of each round a tax rate  $T$  will be displayed on your screen. This tax rate is the same for all members in your group. However, your group's tax rate may change from round to round. After observing your group's tax rate, you and all other members of your group will be asked to independently choose your investment levels, which can be any non-negative number between 0 and 25 up to two decimal places.

The screen has a calculator to assist you in deciding how much to invest in each round. The first row of the calculator displays your group's tax rate. You can calculate your hypothetical earnings for a round by entering two different numbers. Enter a hypothetical investment level choice in the second row and a hypothetical total taxes from the other four members of your group in the third row. You can use the up and down buttons to try different hypothetical levels. The fourth row then displays what your total earnings for the round would be if those hypothetical amounts were the actual amounts in that round. (If you enter these manually instead of using the buttons, you will need to press "Enter" for the calculator to work.) The numbers you enter in the calculator are just hypothetical and do not affect your actual earnings. Remember that your tax rebate consist of one fifth of the taxes collected from your investment earnings and one fifth of the taxes collected from the other members of the group.

After everyone has entered their investment decision and clicked on the "submit button", the computer will display your investment decision as well as the investment decisions made by all the other members of your group. It will appear in a table that also shows their values. All of your own information is highlighted in Red on the table. It will also show your earnings for the round, in tokens, broken down into its three components: after tax investment income, cost of investment, and tax rebate. All of this information is also summarized at the bottom of your screen in the history panel. The history panel will keep track of everything that has happened in your group in all rounds, highlighting your own information in red.

When round 1 is finished, we will move on directly to the next round. The next round will be identical to the previous round except your group's new tax rate  $T$  will be posted on your screen.

### **Summary of Part I:**

- Part I of the experiment consists of 10 rounds.
- Before the beginning of round 1, participants are divided into groups of 5 members each.

- Each member of the group is assigned value V: one member gets V=2, one gets V=6, one gets V=10, one gets V=14 and one gets V=35.
- Assignment of values and the group assignments are fixed for all 10 rounds of Part I.
- In each round, a tax rate T is displayed on the screen. All members of the same group observe the same tax rate T.
- Each member chooses an investment X (number between 0 and 25 with up to two decimal places).
- Decisions and earnings for that round are displayed on your screen and recorded in the history panel

**Part II:** Part II of the experiment also consists of 10 rounds. The group assignments do not change. They are exactly the same as in Part I. Everyone also keeps the same assigned value as in Part I. Just to remind you, there is one member in your group who was assigned  $V = 2$ , one member  $V=6$ , one member  $V=10$ , one member  $V=14$  and one member  $V=35$ .

Each round in Part II is similar to rounds in Part I of the experiment, except that at the beginning of each round all members of the group are asked to submit a proposal for the tax rate T.

While you are deciding what tax rate you wish to propose, the screen has a calculator to assist you in deciding. You can calculate your hypothetical earnings for a round by entering three different numbers. Enter a hypothetical group tax rate in the first row of the calculator. Enter a hypothetical investment decision of yours in the second row and a hypothetical total taxes from the other four members of your group in the third row. You can use the up and down buttons to try different hypothetical levels. The fourth row then displays what your total earnings for the round would be if those hypothetical amounts were the actual amounts in that round. (If you enter these manually instead of using the buttons, you will need to press "Enter" for the calculator to work.) The numbers you enter in the calculator are just hypothetical and do not affect your actual earnings. Remember that your tax rebate consist of one fifth of the taxes collected from your investment earnings and one fifth of the taxes collected from the other members of the group.

After each member of your group has submitted a proposed tax rate, the third highest of the five proposed tax rates is implemented as your group's tax rate for that round. The chosen tax rate will be clearly posted on your screen and is the same for everyone in your group. You will then be asked to choose an investment decision (as you did in the Part I of the experiment). Your investment decision can be any number between 0 and 25 up to two decimal places. You may use the calculator to explore different hypothetical scenarios, as you did in part I.

Once everyone in your group submits their investments, your payoff will be determined and we move on to the next round of the experiment. As before, your payoff in a round depends on the value V assigned to you at the beginning of round 1, your investment X, tax rate T and the tax return, which is determined by the total taxes collected from all members in your group. More precisely, your Payoff in a round consist of three parts:

$$\text{Total Earnings} = \text{Your After Tax Investment Earnings} - \text{Your Cost of Investment} + \text{Tax Rebate}$$



## ONLINE APPENDIX 3 - ADDITIONAL TABLES AND FIGURES

**Table 11:** Wilcoxon Rank-sum test (p-values) comparing tax rates implemented in High and Low inequality treatments, period-by-period.

period	11	12	13	14	15	16	17	18	19	20
p-value	0.0729	0.0197	0.0025	0.0015	0.0000	0.0011	0.0000	0.0000	0.0001	0.0005

*Note.* Data pooled together for DD and RD regimes, last 10 periods.

**Table 12:** Mean Differences Between Observed and Predicted Labor Supply

	High Inequality		Low Inequality	
	DD	RD	DD	RD
Productivity 2	0.41 (0.34)	0.90 (0.66)	0.45 (0.33)	0.01 (0.25)
Productivity 6	0.12 (0.21)	0.03 (0.07)	0.11 (0.22)	-0.23 (0.28)
Productivity 10	0.30 (0.51)	0.41 (0.31)	0.38 (0.23)	0.19 (0.26)
Productivity 14	0.25 (0.18)	0.07 (0.04)	-0.01 (0.36)	0.15 (0.12)
Productivity 18			-0.46 (0.59)	-0.27 (0.25)
Productivity 35	-3.20* (1.64)	-1.76* (0.89)		

*Note.* Robust standard errors are in parentheses, clustered by subject.

\*\*= $p < 0.05$ , \*= $p \in (0.05, 0.10]$

**Table 13:** DD treatment: Equity-Efficiency Tradeoff

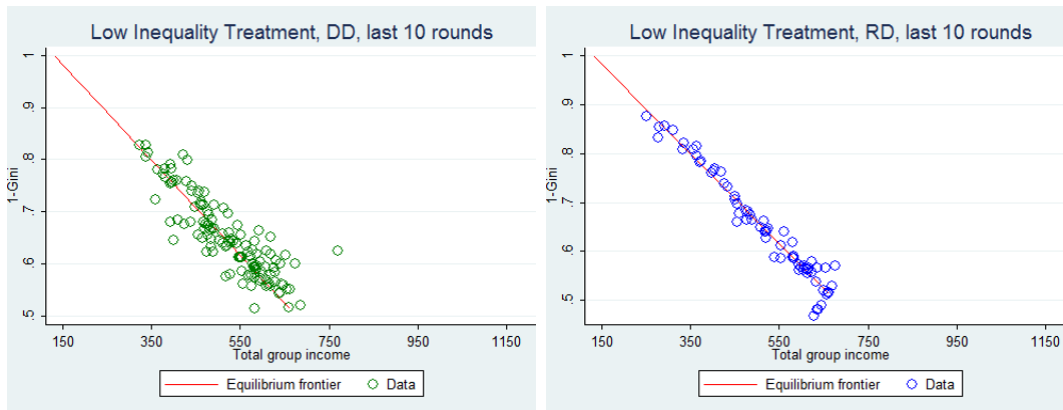
High Inequality treatment			
	Equilibrium	Mean observed	(std err)
Tax rate	0.53	0.47	(0.04)
Gini coefficient	0.31	0.33	(0.03)
Total group income	899.14	822.47	(57.12)
Low Inequality treatment			
	Equilibrium	Mean observed	(std err)
Tax rate	0.28	0.26	(0.03)
Gini coefficient	0.35	0.35	(0.02)
Total group income	512.16	519.90	(17.72)

*Notes.* Robust standard errors in the parentheses are clustered by group.

**Table 14:** RD treatment: Equity-Efficiency Tradeoff

High Inequality treatment			
	Equilibrium	Mean observed	(std err)
Tax rate	0.53	0.54	(0.03)
Gini coefficient	0.31	0.30	(0.02)
Total group income	899.14	811.22	(58.45)
Low Inequality treatment			
	Equilibrium	Mean observed	(std err)
Tax rate	0.28	0.27	(0.07)
Gini coefficient	0.35	0.35	(0.04)
Total group income	512.16	517.17	(36.45)

*Notes.* Robust standard errors in the parentheses are clustered by group.

**Figure 6:** Equity-Efficiency Frontier in Low Inequality treatment

**Figure 7:** Equity-Efficiency Frontier in High Inequality treatment

